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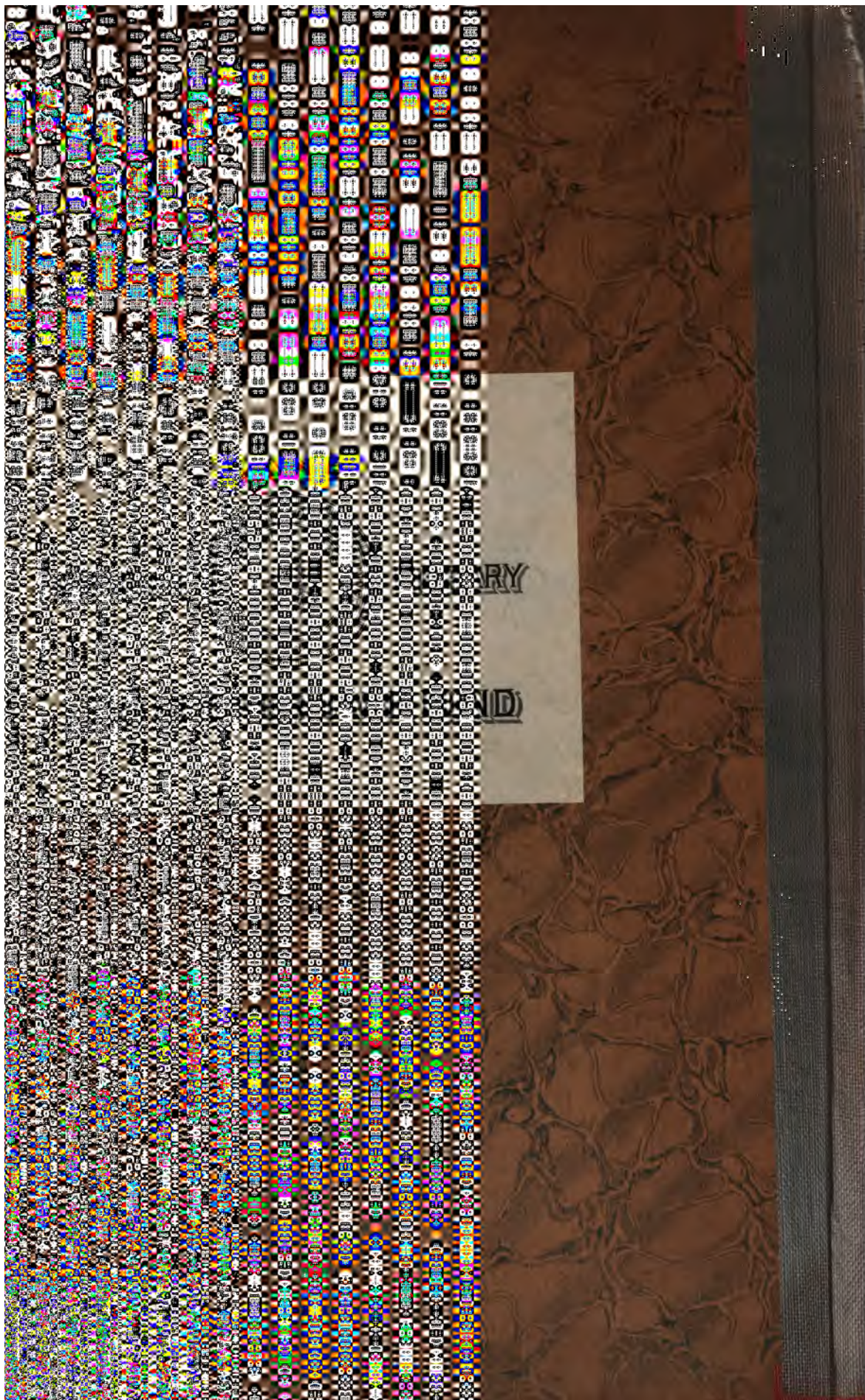
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U A L.

MARKS OF TRADE,

59.

ADMIRAL FITZROY, F.R.S.

SEVENTH EDITION

EDITIONS.)

CONCLUSION:

ROBERT AND WILLIAM SPOTTISWOODE,

RECEIVED BY THE QUEEN'S MOST EXCELLENT MAJESTY.

GOVERNMENT PRINTING OFFICE.

W. E. J. D. P. E. 31, POULTRY, LONDON.

50.

EXPENSE.

DIRECTIONS.

A Barometer, for a Coast weather glass, should be placed where it may be seen at any time, in a good light, by Fishermen, Boatmen, or Seafaring persons.*

It should be set regularly—by a duly authorized person—about sunrise, noon, and sunset.

An explanatory Card†—and a Manual, should be accessible, near the barometer.‡

YASSEL! ZHA!

* These pages may be useful to Farmers and Gardeners, also, though in general, wind affects them less than rain.

† See next page.

‡ In an Aneroid, a metallic, or a wheel barometer, the motion of the hand should correspond to that of mercury in an independent instrument.

B995
G78
1860

EXPLANATORY CARD.

WEATHER GLASSES.

THE BAROMETER RISES
for North-easterly wind.

(including from North-west, by
the *North*, to the Eastward,)

for dry, or less wet weather,—for
less wind,—or for more than one
of these changes :—

EXCEPT on a few occasions when
rain (or snow) comes from the
North-eastward with *strong* wind.

THE BAROMETER FALLS
for South-westerly wind

(Including from South-east, by
the *South*, to the Westward,)

for wet weather,—for stronger
wind,—or for more than one of
these changes :—

EXCEPT on a few occasions when
moderate wind with rain (or snow)
comes from the North-eastward.

For change of wind towards
any of the above directions :—

A THERMOMETER FALLS.

For change of wind towards
the *upper* directions only.

A THERMOMETER RISES.

Moisture, or dampness, in the air (shown by a hygrometer),
increases BEFORE rain, fog, or dew.

On barometer scales the following
contractions may be useful.

RISE

FOR

N ELY.

NW.—N.—E.

DRY

OR

LESS

WIND.

EXCEPT

WET FROM

N Ed.

FALL

FOR

S. WLY.

SE.—S.—W.

WET

OR

MORE

WIND.

EXCEPT

WET FROM

N Ed.

Add one tenth of an inch, to the
observed height, for each hundred feet
the barometer is above the mean sea level.

The *average* height of the barometer,
in England, at the sea level, is about
29.94 inches; and the *average* tempera-
ture of air is nearly 50 degrees.

The thermometer falls about one degree
for each three hundred feet of elevation ;
above more than fifty feet from the ground,

When the wind shifts against the sun,
Trust it not for back it will run.

First rise after very low,
Indicates a stronger blow.

Long foretold—long last.
Short notice—soon past.

24710





HOW TO FORETELL WEATHER.

FAMILIAR as the practical use of weather-glasses is, at sea as well as on land, only those who have long watched their indications, and compared them carefully, are really able to conclude more than that the rising glass* USUALLY foretells less wind or rain, a falling barometer more rain or wind, or both; a high one fine weather, and a low, the contrary. But useful as these general conclusions are *in most cases*, they are *sometimes* erroneous, and then remarks may be rather hastily made, tending to discourage the inexperienced.

By attention to the following observations (the results of many years' practice and many persons' experience) any one not accustomed to use a barometer may do so without difficulty.

* Glass, barometer, column, mercury, quicksilver, or hand.

The barometer shows whether the air is getting lighter or heavier, or is remaining in the same state. The quicksilver falls as the air becomes lighter, rises as it becomes heavier, and remains at rest in the glass tube while the air is unchanged in weight. Air presses on everything within about forty miles of the world's surface, like a *much* lighter ocean, at the bottom of which we live — not feeling its weight, because our bodies are full of air,* but feeling its currents, the winds. Towards any place from which the air has been drawn by suction,† air presses with a force or weight of nearly fifteen pounds on a square inch of surface. Such a pressure holds the limpet to the rock when, by contracting itself, the fish has made a place without air‡ under its shell. Another familiar instance is that of the fly which walks on the ceiling with feet that stick. The barometer tube, emptied of air, and filled with pure mercury, is turned down into a cup or cistern containing the same fluid, which, feeling the weight of air, is so pressed by it as to balance a column of about thirty inches (more or less) in the tube, where no air presses on the top of the column.

* Or atmosphere, or the atmospheric fluid which we breathe.

† Or exhaustion.

‡ A vacuum.

If a long pipe, closed at one end only, were emptied of air, filled with water, the open end kept in water and the pipe held upright, the water would rise in it more than thirty feet. In this way water barometers have been made. A proof of this effect is shown by any well with a sucking pump—up which, as is commonly known, the water will rise nearly thirty feet, by what is called suction, which is, in fact, the pressure of air towards an empty place.

The words on scales of barometers should not be so much regarded for weather indications, as the rising or falling of the mercury; for, if it stand at *Changeable*, and then rise towards *Fair*, it presages a change of wind or weather, though not so great as if the mercury had risen higher; and, on the contrary, if the mercury stand above *fair* and then fall, it presages a change, though not to so great a degree as if it had stood lower: besides which, the direction, and force of wind, are not in any way noticed. It is not from the point at which the mercury may stand that we are alone to form a judgment of the state of the weather, but from its *rising* or *falling*; and from the movements of immediately preceding days as well as hours, keeping in mind effects of change

or moisture, as well as
length of wind.

ould, towards the higher
ranges, or rises and
namely, between about
as (30.9), and less than
on *extraordinary* occa-
sion is from about thirty
to about twenty-nine
inches, except in storms,
twenty-seven inches.

(vernier) divides the tenths
hundredths of an inch.
on the vernier exceeds
the fixed scale by one.

The *weight* of air is *not*
the tube. None can
the tube is full of mer-
cury, and swells by
effect the thread of
mercury drawn down or pushed
thus shows the tem-

point at which water begins to

If a thermometer have a piece of linen tied round the bulb, wetted enough to keep it *damp* by a thread or wick dipping into a cup of water, it will show less heat than a dry one, in proportion to the dryness of the air, and quickness of drying.* In very damp weather, with or *before* rain, fog, or dew, two such thermometers will be nearly alike.

For ascertaining the dryness or moisture of air, the readiest, and surest method is the comparison of two thermometers ; one dry, the other *just* moistened and *kept so*. Cooled by evaporation as much as the state of the air admits—the moist (or wet) bulb thermometer shows a temperature nearly equal to that of the other one when the atmosphere is extremely damp or moist ; but lower at other times,—in proportion to the dryness of air, and consequent evaporation,—as far as twelve or fifteen degrees in this climate ; twenty or even more elsewhere. From four to eight degrees of difference is usual in England ; and about seven is considered healthy for inhabited rooms.

The thermometer fixed to a barometer intended to be used only as a weather-glass shows

* Evaporation.

the temperature of air about it nearly—but does not show the temperature of mercury within exactly. It does so, however, near enough for ordinary practical purposes—provided that no sun, nor fire, nor lamp heat is allowed to act on the instrument partially.

The mercury in the cistern and tube being affected by cold or heat, makes it advisable to consider this when endeavouring to foretell coming weather by the length of the column.

Briefly, the barometer shows weight or pressure of the air; the thermometer—heat and cold, or temperature; and the wet thermometer, compared with a dry one, the degree of moisture or dampness.*

It should always be remembered that the state of the air *foretells coming* weather, rather than shows the weather that is *present*—(an invaluable fact too often overlooked)—that the longer the time between the signs and the change foretold by them, the longer such altered weather will last; and, on the contrary, the less the time

* The two thus combined making a hygrometer: for which some kinds of hair, grass, or seaweed may be a make-shift.

between a warning and a change, the shorter will be the continuance of such foretold weather.

To know the state of the air, not only barometer and thermometers should be watched, but the appearances of the sky should be vigilantly noticed.

If the barometer has been about its ordinary height, say near thirty inches, at the sea level,* and is steady, or rising—while the thermometer falls, and dampness becomes less—North-westerly, Northerly, or North-easterly wind—or less wind—less rain or snow—may be expected.

On the contrary—if a fall takes place, with a rising thermometer and increased dampness, wind and rain may be expected from the South-eastward, Southward, or South-westward.

A fall, with low thermometer, foretells snow.

Exceptions to these rules occur when a North-easterly wind, with wet (rain, hail, or snow) is impending, before which the barometer often rises (on account of the *direction* of the coming

* It differs, or stands lower, about a tenth of an inch for each hundred feet of height directly upwards, or vertically, above the sea; its *average* height being 29·94 inches at the mean sea level in England.

Allowances must, therefore, be made for barometers on high land, or in buildings.

wind alone) and deceives persons who, from that sign only (the rising), expect fair weather.

When the barometer is rather below its ordinary height, say down to near twenty-nine inches and a half (at the sea level), a rise foretells less wind, or a change in its direction towards the Northward,—or less wet; but when it has been very low, about twenty-nine inches—the first rising usually precedes, or indicates, strong wind—at times heavy squalls—from the North-westward — Northward — or North-eastward — *after* which violence a gradually rising glass foretells improving weather — if the thermometer falls. But, if the warmth continue, probably the wind will back (shift against the sun's course), and more Southerly, or South-westerly wind will follow: especially if the barometer rise is sudden.

The most dangerous shifts of wind, or the *heaviest* Northerly gales, happen *soon* after the barometer *first* rises from a very low point: or, if the wind veers *gradually*, at some time afterwards.

Indications of approaching changes of weather, and the direction and force of winds, are shown less by the height of the barometer, than by its falling or rising. Nevertheless, a height of more than thirty (30.0) inches (at the level of the sea) is indicative of fine weather and *moderate* winds; *except* from East to North, *occasionally*.

The barometer is said to be *falling*, when the mercury in the tube is sinking, at which time its upper surface is sometimes concave or hollow ; or when the hand (see note in page 2) moves to the left. The barometer is *rising*, when the mercurial column is lengthening ; its upper surface being convex or rounded, or when the hand moves to the right (see note in page 2).

A rapid rise of the barometer indicates unsettled weather. A slow movement the contrary ; as likewise a *steady* barometer, which, when continued, and with dryness, foretells very fine weather.

A rapid and considerable fall, is a sign of stormy weather, and rain (or snow). Alternate rising and sinking indicates unsettled and threatening weather.

The greatest depressions of the barometer are with gales from SE., S., or SW. ; the greatest elevations, with wind from NW., N., or NE.,—or with calm.

Though the barometer generally falls with a Southerly, and rises with a Northerly wind, the contrary sometimes occurs ; in which cases, the Southerly wind is usually dry with fine weather, or the Northerly wind is violent and accompanied by rain, snow, or hail ; perhaps with lightning.

When the barometer sinks considerably, much wind, rain, (perhaps, with hail) or snow will follow ; with or without lightning. The wind will be from the Northward, if the thermometer is low (for the season) — from the Southward, if the thermometer is high. Occasionally a low glass is followed or attended by lightning *only* ; while a storm is beyond the horizon.

A sudden fall of the barometer, with a Westerly wind, is sometimes followed by a violent storm from NW., or North, or NE.

If a gale sets in from the E. or SE., and the wind veers by the South, the barometer will continue falling until the wind is near a marked change, when a lull *may* occur ; after which, the gale will soon be renewed, perhaps suddenly and violently, and the veering of the wind towards the NW., North or NE. will be indicated by a rising of the barometer with a fall of the thermometer.

Three causes (at least) * appear to affect a barometer :—

1. The direction of the wind—the North-east wind tending to raise it most—the South-west to

* Electrical effects are yet uncertain.

lower it the most, and wind from points of the compass between them proportionally as they are nearer one or the other extreme point.

NE. and SW. may therefore be called the wind's extreme bearings (rather than *poles*?).

The range, or difference of height shown, due to change of direction *only*, from one of these bearings to the other (supposing strength or force, and moisture, to remain the same), amounts in these latitudes to about half an inch (as read off).

2. The amount—taken by itself—of vapour, moisture, wet, rain, or snow, in the wind, or current of air (direction and strength remaining the same), seems to cause a change amounting in an extreme case to about half an inch.

3. The strength or force alone of wind, from any quarter (moisture and direction being unchanged), is preceded, or foretold, by a fall or rise, according as the strength will be greater or less, ranging in an extreme case to more than two inches.

Hence, supposing the three causes to act together—in extreme cases—the height would vary from near thirty-one inches (30.9) to about



lower it than

compensation. Although it falls lowest before
nearer clouds, it frequently sinks very much before
on. The barometer falls, but *not always*

At the approach of thunder and lightning.*
winds are and during the *earlier* part of settled
it usually stands high, and is stationary ;
being dry.

to change instances of fine weather, with a low glass,
become however rarely, but they are always pre-
and to a duration of wind or rain, *if not both*.
these

After very warm and calm weather, a storm or
with rain, may follow ; likewise at any time
the atmosphere is *heated* much above the
temperature of the season.

Allowance should *invariably* be made for the
previous state of the glasses during *some days, as*
as some hours, because their indications *may*
affected by distant causes, or by changes close
hand. Some of these changes may occur at a
greater or less distance, influencing neighbouring
regions, but not visible to each observer whose
barometer feels their effect.

There may be heavy rains or violent winds
beyond the horizon, and the view of an observer,

* Thunder clouds rising from *northeastward*, against the wind,
do not usually cause a fall of the barometer.

by which his instruments may be affected considerably, though no particular change of weather occurs in his immediate locality.

It may be repeated, that the longer a change of wind or weather is foretold before it takes place, the longer the presaged weather will last: and, conversely, the shorter the warning, the less time, whatever causes the warning, whether wind or a fall of rain or snow, will continue.

Sometimes severe weather from the Southward, *not lasting long*, may cause no great fall, because followed by a *duration* of wind from the Northward;—and at times the barometer may fall with Northerly winds and fine weather, apparently against these rules, because a *continuance* of Southerly wind is about to follow. By such changes as these one may be misled, and calamity may be the consequence; if not duly forewarned.

A few of the more marked signs of weather—useful alike to seaman, farmer, and gardener, are the following:

Whether clear or cloudy—a rosy sky at sunset presages fine weather:—a red sky in the morning bad weather, or much wind (perhaps

rain):—a grey sky in the morning, fine weather :—
a high dawn, wind :—a low dawn, fair weather.*

Soft-looking or delicate clouds foretell fine weather, with moderate or light breezes :—hard edged oily-looking clouds,—wind. A dark, gloomy, blue sky is windy ;—but a light, bright blue sky indicates fine weather. Generally, the *softer* clouds look, the less wind (but perhaps more rain) may be expected ;—and the harder, more “greasy,” rolled, tufted, or ragged,—the stronger the coming wind will prove. Also—a bright yellow sky at sunset presages wind ; a pale yellow, wet :—and thus by the prevalence of red, yellow, or grey tints, the coming weather may be foretold very nearly :—indeed, if aided by instruments, almost exactly.

Small inky-looking clouds foretell rain :—light scud clouds driving across heavy masses show wind and rain ; but, if alone, may indicate wind only.

High upper clouds crossing the sun, moon, or stars, in a direction different from that of the

* A “high dawn” is when the first indications of daylight are seen above a bank of clouds. A “low dawn” is when the day breaks on or near the horizon, the first streaks of light being very low down.

lower clouds, or the wind then felt below,—foretell a change of wind.*

After fine clear weather, the first signs, in the sky, of a coming change, are usually light streaks, curls, wisps, or mottled patches of white distant cloud, which increase, and are followed by an overcasting of murky vapour that grows into cloudiness. This appearance, more or less oily, or watery, as wind or rain will prevail, is an infallible sign.

Usually the higher and more distant such clouds seem to be,—the more gradual, but general, the coming change of weather will prove.

Light, delicate, quiet tints or colours, with soft, undefined forms of clouds, indicate and accompany fine weather: but gaudy, or unusual hues, with hard, definitely outlined clouds, foretell rain, and probably strong wind.

Misty clouds forming, or hanging on heights, show wind and rain coming—if they remain, in-

* In the tropics, or regions of trade winds, there is generally an upper and counter current of air, with very light clouds, which is not an indication of any approaching change. In middle latitudes such upper currents are not so frequent (*or evident?*) except before a change of weather.

crease or descend. If they rise, or disperse—the weather will improve, or become fine.

When sea birds fly out early, and far to seaward, moderate wind and fair weather may be expected. When they hang about the land, or over it, sometimes flying inland, expect a strong wind, with stormy weather. As many creatures, besides birds, are affected by the approach of rain or wind; such indications should not be slighted by an observer who wishes to foresee weather.

There are other signs of a coming change in the weather known less generally than may be desirable; and therefore worth notice: such as, when birds of long flight, rooks, swallows, or others, hang about home, and fly up and down or low—rain or wind may be expected. Also when animals seek sheltered places, instead of spreading over their usual range; when pigs carry straw to their sties; when smoke from chimneys does not ascend readily (or straight upwards during calm), an unfavourable change is probable.

Dew is an indication of fine weather; so is fog. Neither of these two formations occurs under an overcast sky, or when there is much wind. One sees fog occasionally rolled away, as it were, by wind—but seldom or never *formed* while it is blowing.

Remarkable clearness of atmosphere, near the horizon : distant objects, such as hills, unusually visible ; or raised (by refraction)*—and what is called “ a good *hearing* day,” may be mentioned among signs of wet, if not wind, to be expected.

More than usual twinkling of the stars ; indistinctness or apparent multiplication of the moon’s horns ; haloes ; “ wind-dogs,”†—and the rainbow ; are more or less significant of increasing wind, if not approaching rain, with or without wind.

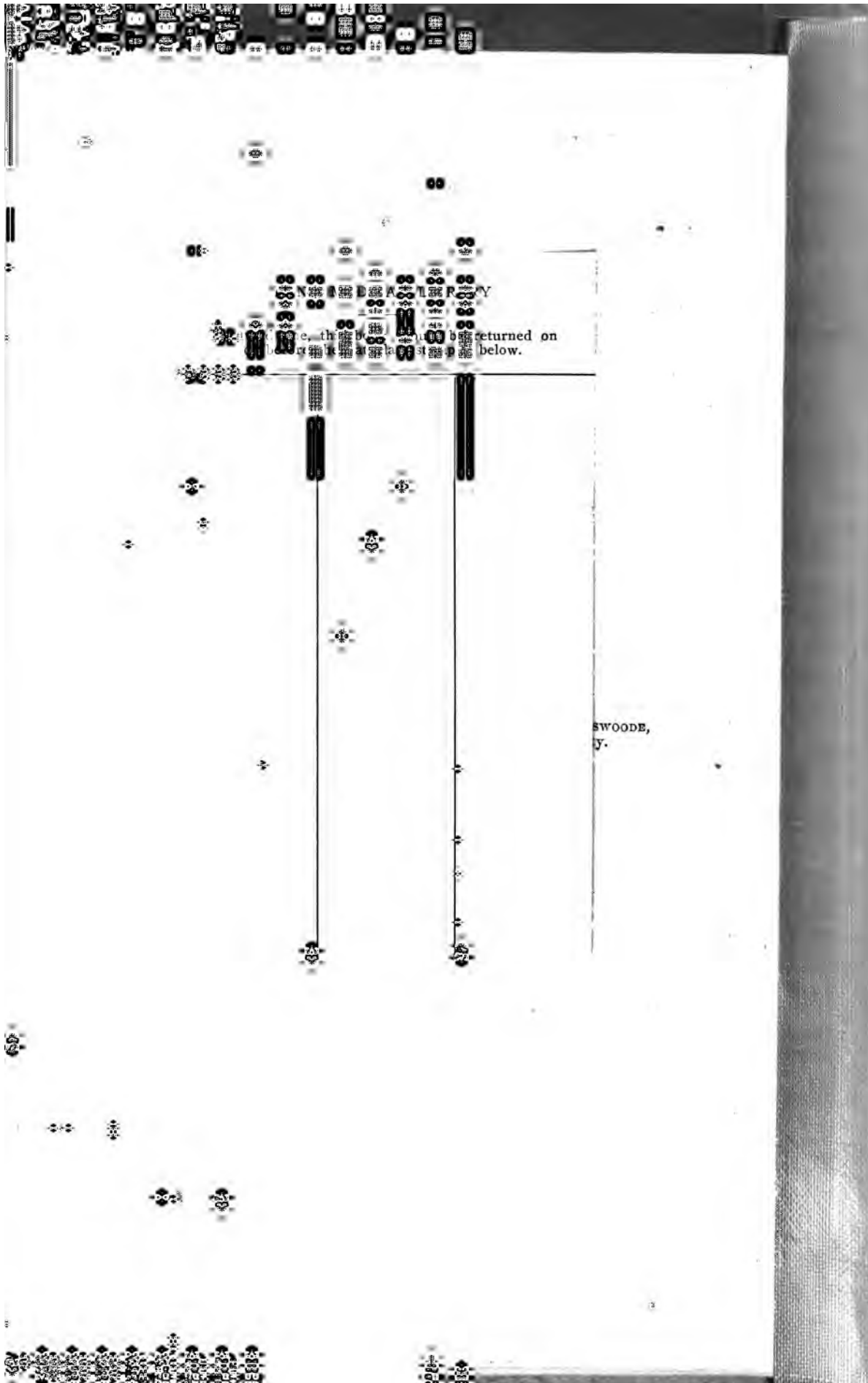
Near land, in sheltered harbours, in valleys, or over low ground, there is usually a marked diminution of wind—during part of the night—and a dispersion of clouds. At such times an eye on an overlooking height may see an extended body of vapour below (rendered visible by the cooling of night) which *seems* to check the wind.

Lastly, the dryness, or dampness of the air, and its temperature (for the season), should *always* be considered—with *other* indications of change, or continuance of wind and weather.

* Much refraction is a sign of easterly wind.

† Fragments or pieces (as it were) of rainbows (sometimes called “ wind-galls”) seen on detached clouds.





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